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LOGINID:d347jwb
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=> s 251/313/ccls and refrigerator

          147 251/313/CCLS
        18729 REFRIGERATOR
L1          0 251/313/CCLS AND REFRIGERATOR

=> s 251/313/ccls and damper

          147 251/313/CCLS
        22047 DAMPER
L2          1 251/313/CCLS AND DAMPER

=> d cit l2

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313; 431/20 [IMAGE AVAILABLE]

=> s 251/303/ccls and refrigerator

          476 251/303/CCLS
        18729 REFRIGERATOR
L3          1 251/303/CCLS AND REFRIGERATOR

=> d cit l3

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=> s 251/303/ccls and damper

          476 251/303/CCLS
        22047 DAMPER
L4          9 251/303/CCLS AND DAMPER

=> d cit l4 1-9

1.  5,303,897, Apr. 19, 1994, Arrangement in valve dampers; Paul
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Kolt, 454/358; 251/297, 303 [IMAGE AVAILABLE]

3.  RE 31,562, Apr. 24, 1984, Heating vent for electric clothes dryer;
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AVAILABLE]

4.  4,156,973, Jun. 5, 1979, Heating vent for electric clothes dryer;
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AVAILABLE]

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126/285B; 137/601; **251/303**; 454/363 [IMAGE AVAILABLE]

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8. 3,899,156, Aug. 12, 1975, Single blade fire **damper**; Francis J. McCabe, **251/303**; 137/75, 457; 292/121; 454/369 [IMAGE AVAILABLE]

9. 3,614,486, Oct. 19, 1971, LEVER MOTION MULTIPLIER DRIVEN BY ELECTROEXPANSIVE MATERIAL; Parker C. Smiley, 310/323; 101/93.01, 93.2, 212; 251/129.06, **303**; 310/26, 317; 400/167 [IMAGE AVAILABLE]

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=> s 62/408/ccls and refrigerator

          646 62/408/CCLS
        18729 REFRIGERATOR
L5         67 62/408/CCLS AND REFRIGERATOR

=> s 62/408/ccls and damper

          646 62/408/CCLS
        22047 DAMPER
L6         51 62/408/CCLS AND DAMPER

=> s damper (p) motor (p) refrigerator

        22047 DAMPER
       407949 MOTOR
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SEARCH ENDED BY USER

=> s damper (p) motor (p) refrigerator and 62/408/ccls

        22047 DAMPER
       407949 MOTOR
        18729 REFRIGERATOR
           50 DAMPER (P) MOTOR (P) REFRIGERATOR
          646 62/408/CCLS
L7          6 DAMPER (P) MOTOR (P) REFRIGERATOR AND 62/408/CCLS

=> d kwic l7 1-6
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US PAT NO: 5,778,694 [IMAGE AVAILABLE] L7: 1 of 6
US-CL-CURRENT: 62/187, **408**; 236/51

ABSTRACT:

A **refrigerator** includes a plurality of cold air inlet openings formed in a rear wall of the refrigerating compartment for directing cold air in respective directions into the refrigerating compartment. A **motor**-driven rotary **damper** is provided to control which of the inlet openings receives cold air, as well as the quantity of air introduced. . . cooling) of cooling operation the amount of air supplied corresponds to the number of air inlet openings opened by the **damper**. In a second cooling mode (concentrated cooling), the **damper** is oriented to cause the air to be introduced into the refrigerating chamber in a specific direction where cooling is needed. In a third cooling mode (automatic swinging), the **damper** is oscillated while the cold air is being supplied.

SUMMARY:

BSUM(13)

It is another object of the present invention to provide a cooling air supply control apparatus of a **refrigerator** and a control method thereof by which an eccentric **damper** is controllably driven by a stepping **motor** for being driven by a control of control means, to not only cool a particular area concentratively but also to. . .

SUMMARY:

BSUM(26)

According to the cooling air supply control apparatus of a **refrigerator** and a method thereof thus described, the cooling air discharge quantity and discharge direction are controlled by the stepping **motor** drive according to adjustment of the control of the eccentric **damper**, to thereby enable the cooling air to be discharged partially or discharged to the left and to the right in. . .

DETDESC:

DETD(39)

Meanwhile, . . . operation mode is the automatic swing operation mode (in case of Yes), the control means 42 outputs to the fan **motor** driving means 44 a control signal for driving the fan **motor** 14 to thereby drive the fan 14a, and at the same time, the stepping **motor** driving means 46 outputs a control signal for driving the stepping **motor** 26. The eccentric **damper** 27 is then driven to thereby control the **refrigerator** by way of the automatic swing operation mode which will be later described.

DETDESC:

DETD(41)

At this time, because a signal for driving the stepping **motor** 26 is being input to the stepping **motor** driving means 46 from the control means 42, the eccentric **damper** 27 is rotated according to drive of the stopping **motor** 26, to close a cooling air route of the duct 20 and to thereby terminate control operation of tire **refrigerator**.

CLAIMS:

CLMS(1)

What is claimed is:

1. A **refrigerator** comprising:
a refrigerating chamber having a rear wall;
a duct disposed at the rear wall for guiding a flow of cold. . . into respective horizontally adjacent areas of the refrigerating chamber;
temperature sensors for detecting temperatures in different regions of the refrigerating chamber;
a **motor**-driven fan for circulating cold air through the duct and the air inlet openings and into the refrigerating chamber;
a **damper** arranged adjacent the group of cold air inlet openings and being rotatable about an axis, the **damper** arranged eccentrically relative to the axis for controlling cold air flows through the cold air inlet openings relative to one another depending on a rotary position of the **damper**;
a stepping **motor** connected to the **damper** for rotating the **damper** about the axis;
a switch for determining a rotational position of the **damper**; and
a control mechanism connected to the temperature sensors and the stepping **motor** for comparing sensed temperatures with a reference

temperature and rotating the **damper** for directing cold air into the refrigerating chamber to eliminate temperature differences between the reference temperature and the sensed temperatures.

CLAIMS:

CLMS(6)

6. The **refrigerator** according to claim 1 wherein the duct extends vertically, the at least one group of horizontally spaced cold air inlet. . . openings comprises at least two of said groups, said at least two groups spaced apart vertically; there being one said **damper** for said at least two groups; said **damper** mounted to the stepping **motor** for being rotated thereby about a vertical axis.

CLAIMS:

CLMS(7)

7. A **refrigerator**, comprising:
a refrigerating chamber having a rear wall;
a duct disposed at the rear wall for guiding a flow of cold. . . into respective horizontally adjacent areas of the refrigerating chamber;
temperature sensors for detecting temperatures in different regions of the refrigerating chamber;
a **motor**-driven fan for circulating cold air through the duct and the cold air inlet openings and into the refrigerating chamber;
a **damper** arranged adjacent the group of cold air inlet openings and being rotatable about an axis, said **damper** arranged eccentrically relative to the axis for adjusting cold air flows through the cold air inlet openings relative to one another depending on a rotary position of the **damper**;
a stepping **motor** connected to the **damper** for rotating the **damper** about the axis;
a switch for determining a rotational position of the **damper**; and
a control mechanism connected to the temperature sensors and the stepping **motor** for comparing sensed temperatures with a reference temperature and rotating the **damper** for establishing a quantity of cold air through the air inlet openings in accordance with the magnitude of a difference. . .

CLAIMS:

CLMS(9)

9. A **refrigerator** comprising:
a body forming a refrigerating chamber having a rear wall, a duct disposed in the rear wall for receiving. . . into horizontally adjacent areas of the refrigerating chamber;
a cold air generator for supplying cold air to the duct; and a **motor**-driven **damper** disposed in the duct with respective portions of the **damper** adjacent each of the groups of cold air inlet openings and positionable in different positions for directing cold air to. . .

US PAT NO: 5,765,388 [IMAGE AVAILABLE] L7: 2 of 6
US-CL-CURRENT: **62/408**, 441

CLAIMS:

CLMS(3)

3. The **refrigerator** as claimed in claim 1, further comprising a stepping **motor** for driving said changing **damper**.

US PAT NO: 5,715,70[redacted] IMAGE AVAILABLE] L7: 3 of 6
US-CL-CURRENT: 62/455, [redacted], **408**

SUMMARY:

BSUM(6)

The air discharged by the **refrigerator** fan into the freezer compartment is also supplied to the fresh food compartment. A typical **refrigerator** employs a mechanical or bellows type **damper** in order to control this air flow from the freezer compartment to the fresh food compartment. The position of the **damper** is controlled by a temperature sensor in the fresh food compartment so that the position of the **damper** controls the temperature of the fresh food compartment. However, a **damper** is slow to respond to control signals and, thus, permits unnecessarily large temperature swings within the fresh food compartment. Also, the use of a single **refrigerator** fan to supply cooled air to both the freezer and fresh food compartments requires the **refrigerator** fan speed to be relatively high, and this high fan speed increases the noise of operating the **refrigerator**. Moreover, the **refrigerator** fan is usually driven by an AC **motor** which consumes a large amount of energy.

US PAT NO: 5,678,413 [IMAGE AVAILABLE] L7: 4 of 6
US-CL-CURRENT: 62/89, 186, **408**

DETDESC:

DETD(8)

As . . . in the upper end of housing 17, for guiding cool air produced from evaporator 12 into refrigeration compartment 3. A **damper** 19 for controlling the amount of cool air provided to the refrigeration compartment by opening/closing guide path 18 and a **damper motor** 20 for driving **damper** 19 are built in the upper end of housing 17. Temperature in refrigeration compartment 3 is controlled by using these constituents in a conventional manner. A **damper** cover 21 is incorporated in front plate 24 in the embodiment and a spacer 22 is formed of an insulating material. Spacer 22 is made thick to prevent condensation on **damper** cover 21 which results from a large amount of cool air passing through guide path 18. Therefore, the upper part of housing 17 having **damper** 19 and **damper motor** 20 installed therein is also made relatively thick and wide, but its exact dimensions depend on the approximate dimensions of the **refrigerator** itself. (For a 400-500 l **refrigerator**, the thickness and width of the housing and are preferably 12 cm and 34 cm, respectively.) A cool air discharge hole 23 formed into **damper** cover 21 serves to discharge cool air from guide path 18 to auxiliary compartment 9. Thus, auxiliary compartment 9 is. . .

CLAIMS:

CLMS(13)

13. In a **refrigerator** having a body which is equipped with a freezer compartment and a refrigeration compartment, an evaporator for producing cool air. . . in the front surface, for distributing left and right or collecting said cool air from said discharge holes, a driving **motor** for rotating said cool air discharge adjustment blade, first temperature sensors installed in the center of one side wall of. . . said middle plate, and a second dispersion guiding blade for vertically connecting said middle plate and said lower plate; a **refrigerator** temperature controlling method in said control portion comprising the steps of:
determining whether a refrigerant circulating compressor is initially turned on, when power is applied;

determining whether a door of a **refrigerator** is open, when said compressor is not initially on;

firstly discharging cool air to be distributed by rotating a discharge **damper** with **damper** control means for controlling the amount of the cool air discharged into a **refrigerator**, when said compressor is initially on; secondly discharging cool air to be distributed by rotating said discharge **damper** with said **damper** control means for controlling the amount of the cool air discharged into said **refrigerator**, when said door is open;

determining whether the average value of temperatures sensed by first temperature sensing means provided at a first position of said **refrigerator** is larger than the average value of temperatures sensed by second temperature sensing means provided at a second position of said **refrigerator** to face the first temperature sensing means, when said door is not open;

discharging the cool air toward said first temperature. . .

CLAIMS:

CLMS(19)

19. In a **refrigerator** having a body having a freezer compartment and a refrigeration compartment, an evaporator for producing cool air and providing said. . . in the front surface, for distributing left and right or collection said cool air from said discharge holes, a driving **motor** for rotating said cool air discharge adjustment blade, first temperature sensors installed in the center of one side wall of. . . said middle plate, and a second dispersion guiding blade for vertically connecting said middle plate and said lower plate; a **refrigerator** temperature controlling method in said control portion comprising the steps of:

determining whether a refrigerant circulating compressor is initially on,. . . is applied;

determining whether said compressor is on in a normal operation, when said compressor is not initially on;

determining whether a **damper** for controlling the amount of cool air discharged into a **refrigerator** is open, when said compressor is on in the normal operation;

determining whether a control reference temperature for discharge of cool. . . are selected from at least two temperature sensing means arranged to face each other a predetermined distance apart, when said **damper** is open;

determining whether a control reference temperature for non-discharge of cool air is larger than the absolute value of a. . . is larger than the absolute value of a difference in temperatures sensed by said two temperature sensing means, when said **damper** is open;

firstly discharging the cool air in a predetermined direction, when said control reference temperature for discharge of cool air. . .

US PAT NO: 5,642,628 [IMAGE AVAILABLE] L7: 5 of 6
US-CL-CURRENT: 62/186, **408**; 165/294

DETDESC:

DETD(11)

In a still further embodiment of the present invention, single control **damper** 160 comprises a slide 180 (FIG. 3) having an outlet aperture 183 therein and that is movably disposed (such as. . . of air passage 120. Plenum 185 comprises a plurality of output ports 186 which are coupled to respective compartments in **refrigerator** 100 (by way of example, and not limitation, two representative output ports 186 are illustrated in FIG. 3 as underlying slide 180). Drive apparatus 170 comprises **motor** 172 coupled to slide 180 via a drive shaft 178 such that rotation of **motor** 172 causes motion of slide across plenum 185

such that outlet apertu[redacted]183 is disposed in a selected [redacted]ition with.

DETDESC:

DETD(12)

Damper drive control system 155 (FIG. 1) further comprises a control unit 190 that is coupled to **damper** drive apparatus 170. Control unit is adaptedto provide a **damper** position signal that, when coupled to drive apparatus 170, causes **motor** 172 to drive **damper** 160 to a desired air flow position such that cooling-air flow is directed into a selected outlet port in manifold region 125 of air passage 120. Control unit 190 comprises sensorsto determine the cooling demand of respective compartments in **refrigerator** 100. Cooling demand can be determined by temperature measurements, need for defrost, number of door openings of the **refrigerator**, ambient environmental conditions, or the like. As one example, temperature sensor 192 is disposed in first compartment 130 and temperature. . . comprise a portion of an overall refrigeration system controller as is described in copendingapplication Ser. No. 08/301,731, entitled "Energy Efficient **Refrigerator** Control System", which is assigned to the assignee of the present invention and is incorporated herein by reference

US PAT NO: 3,793,847 [IMAGE AVAILABLE] L7: 6 of 6
US-CL-CURRENT: 62/190, 186, 187, **408**, 419

DETDESC:

DETD(9)

The disclosed **refrigerator** has, in effect, three controls comprising thermostat 35, upper **damper** 43, and lower **damper** 44. Thermostat 35 controls operation of the **motor** compressor to maintain a preferred food compartment temperature of about 37.degree. F., as may be selected by adjusting knob 35b, and lower **damper** 44 is in effect an air-splitting means which proportions the evaporator cooled air between **refrigerator** compartment 12 and freezer compartment 11, in order to afford desired temperature differentials (e.g., about 37.degree. F.) between these compartments.